

Chapter NR 422

**CONTROL OF ORGANIC COMPOUND EMISSIONS FROM
SURFACE COATING, PRINTING AND ASPHALT SURFACING
OPERATIONS**

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NR 422.01 Applicability; purpose. (1) **APPLICABILITY.** This chapter applies to all surface coating and printing process air contaminant sources and to their owners and operators. This chapter also applies to the handling and use of cutback asphalts for application to surfaces traversed by motor vehicles, bicycles or pedestrians and to all persons responsible for such handling and use.

(2) **PURPOSE.** This chapter is adopted under ss. 144.31 and 144.38, Stats., to categorize organic compound emissions from surface coating, printing and asphalt surfacing operations into separate organic compound air contaminant source categories and to establish emission limitations or other requirements for these categories of sources in order to protect air quality.

History: Cr. Register, September, 1986, No. 369, eff. 10-1-86; am. Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.02 Definitions. In addition to the definitions in this section, the definitions contained in chs. NR 400, 419, 420 and 421 apply to the terms used in this chapter.

(1) "Air dried coating" means coatings which are dried by the use of air or forced warm air. Forced warm air includes processes whereby the coated object is heated above ambient temperature up to a maximum of 90°C (194°F) to decrease drying time.

(2) "Application area" means the area where a coating is applied by spraying, dipping or flow coating techniques.

(3) "Asphalt" means a dark-brown to black cementitious material (solid, semisolid, or liquid in consistency) in which the predominating constituents are bitumens which occur in nature as such or which are obtained as residue in refining petroleum.

(4) "Baseline transfer efficiency" means the typical transfer efficiency, as defined by the department, for a specific operation in an industry.

(5) "Blade coating" means the application of a coating material to a substrate by means of drawing the substrate beneath a straight-edged blade that spreads the coating evenly over the full width of the substrate.

(7) "Class II hardboard paneling finish" means finishes which meet the specifications of Voluntary Product Standard PS-59-73 as approved by the American National Standards Institute. This standard is incorporated by reference in ch. NR 484.

(8) "Clear coat" means a coating which lacks color and opacity or is transparent and uses the undercoat as a reflectant base or undertone color.

(9) "Coating applicator" means a device or devices used at a single location in a coating line to apply a surface coating of a particular material.

(10) "Coating line" means one or more apparatus or operations, which may include a coating applicator, flashoff area, and oven, wherein a surface coating is applied, dried, or cured.

(11) "Coil coating" means the coating of any flat metal sheet or strip that comes in rolls or coils.

(12) "Cutback asphalt" means asphalt cement which has been liquefied by blending with petroleum solvents (diluent) other than residual oils. Upon exposure to atmospheric conditions the diluents evaporate, leaving the asphalt cement to perform its function. Asphalt which contains less than 5% by weight petroleum solvents (disregarding any residual oils added) is not included in this definition.

(12m) "Emergency response vehicle" means any motor vehicle specifically designed to carry equipment and personnel involved in providing emergency medical or rescue services.

(12s) "Emulsified asphalt" means an emulsion of asphalt cement and water which contains a small amount of an emulsifying agent; a heterogeneous system containing 2 normally immiscible phases (asphalt and water) in which the water forms the continuous phase of the emulsion, and minute globules of asphalt form the discontinuous phase.

(13) "End sealing compound" means a synthetic rubber compound which is coated onto can ends and which functions as a gasket when the end is assembled on the can.

(14) "Exterior base coating" means a coating applied to the exterior of a can to provide exterior protection to the metal and to provide background for the lithographic or printing operation.

(15) "Extreme performance coatings" means coatings designed for harsh exposure or exposure to one or more of the following: the weather all of the time, temperatures consistently above 95°C, detergents, abrasive and scouring agents, solvents, corrosive atmospheres, or similar environmental conditions.

(16) "Fabric coating" means applying a coating, including a saturation coating, or printing on to a textile substrate with a blade, roll, rotogravure or dip coater, or other coating applicator, to impart properties that are not initially present, such as strength, stability, water or acid repellancy, or appearance.

(16m) "Fire truck" means any motor vehicle specifically designed to be used in fighting fires and to carry equipment and personnel involved in fighting fires.

(17) "Flashoff area" means the space between the application area and the oven.

(18) "Flexographic printing" means the application of words, designs or pictures to a substrate by means of a roll printing technique in which the pattern to be applied is raised above the printing roll and the image carrier is made of rubber or other elastomeric materials.

(19) "Furniture metal coating" means the surface coating of any furniture made of metal or any metal part which will be assembled with other metal, wood, fabric, plastic or glass parts to form a furniture piece.

(20) "Hardboard" means a panel manufactured primarily from interfelted ligno-cellulosic fibers which are consolidated under heat and pressure in a hot press.

(21) "Hardwood plywood" means a plywood whose surface layer is a veneer of hardwood.

(21m) "High performance architectural coatings" means a coating which meets the requirements specified in Architectural Aluminum Manufacturer's Association publication number AAMA 605.2-1985, incorporated by reference in ch. NR 484.

(22) "Interior sheet base coating" means a coating applied by roller coater or spray to the interior side of sheets from which cans are formed to provide a protective lining between the can metal and product.

(23) "Interior body spray" means a coating sprayed on the interior of the can body to provide a protective film between the product and the can.

(24) "Large appliances" means doors, cases, lids, panels and interior support parts of residential and commercial washers, dryers, ranges, refrigerators, freezers, water heaters, dishwashers, trash compactors, air conditioners and other similar products. Not included are products of such weight that they are normally lifted only with powered lifting equipment or products which are intended to be permanently fastened in place.

(24m) "Leather coating" means the coating of any raw or processed leather material with a roll coater, spray system, or other coating applicator to impart or enhance properties such as strength, stability, water or acid repellency, color or appearance.

(25) "Low solvent coating or ink" means a coating or ink which contains less organic solvent than the conventional coatings used by the particular industry. Low solvent coatings or inks include water-borne, higher solids, electrodeposition and powder coatings or inks.

(26) "Magnet wire coating" means the process of applying a coating of electrically insulating varnish or enamel to aluminum or copper wire for use in electrical machinery.

(27) "Manufacturing plant" means a facility where parts are manufactured, finished or assembled for eventual inclusion into a finished

product ready for sale to retailers. With respect to the manufacture of motor vehicles, customizers, body shops and other repainters are not included in this definition.

(28) "Natural finish hardwood plywood panels" means panels whose original grain pattern is enhanced by essentially transparent finishes which may be supplemented by fillers and toners.

(28m) "Organisol" means a thick coating containing resin, plasticizers and organic solvent used to coat flexible substances such as paper or fabrics.

(29) "Oven" means, for the purpose of surface coating, a chamber within which heat is used to bake, cure, polymerize, or dry a surface coating.

(30) "Overvarnish" means a coating applied directly over ink to reduce the coefficient of friction, to provide gloss and to protect the finish against abrasion and corrosion.

(31) "Packaging rotogravure printing" means rotogravure printing upon paper, paper board, metal foil, plastic film, or other substrates, which in subsequent operations are formed into packaging products or labels for articles to be sold.

(32) "Paper coating" means application of the uniform coatings, including saturation coatings, put on paper and pressure sensitive tape regardless of substrate. Related web coating processes on plastic films and on metal foil are included in this definition but processes such as printing where the coating is not uniform across the web are not included.

(33) "Penetrating prime coat" means an application of low-viscosity liquid asphalt to an absorbent surface to prepare it for an asphalt surface.

(33g) "Plastisol" means a composition of finely divided resin and plasticizer used to coat flexible substances such as paper or fabrics which is applied as a thick gel which solidifies when heated.

(33m) "Pretreatment coat" means a coating applied directly to metal substrates and which contains at least ½% acid, by weight, and is used to provide surface etching, corrosion resistance and enhanced adhesion of subsequent coatings.

(34) "Prime coat" means a coating applied directly to a substrate or on top of a pretreatment coat or other coating for purposes of providing corrosion resistance or enhancing adhesion or blister resistance of subsequent coatings.

(35) "Printed interior panels" means panels whose grain or natural surface is obscured by fillers and basecoats upon which a simulated grain or decorative pattern is printed.

(36) "Publication rotogravure printing" means rotogravure printing upon paper which is subsequently formed into books, magazines, catalogues, brochures, directories, newspaper supplements, and other types of printed materials.

(37) "Quench area" means a chamber where the hot metal exiting the oven is cooled by either a spray of water or a blast of air followed by water cooling.

(38) "Roll coating" means the application of a coating material to a substrate by means of hard rubber or steel rolls.

(39) "Roll printing" means the application of words, designs or pictures to a substrate, usually by means of a series of hard rubber or steel rolls each with only partial coverage.

(40) "Rotogravure coating" means the application of a coating material to a substrate by means of a roll coating technique in which the pattern to be applied is etched on the coating roll. The coating material is transferred to the substrate from the recessed areas on the coating roll.

(41) "Rotogravure printing" means the application of words, designs or pictures to a substrate by means of a roll printing technique which involves an intaglio or recessed image areas in the form of cells.

(41m) "Saturation coating" means application of a coating which permeates the substrate to which it is applied.

(42) "Single coat" means a single film of coating applied directly to a metal substrate, omitting the primer application.

(43) "Surface coating" means the application of a coating to a product in a coating line.

(44) "Thin particleboard" means a manufactured board 0.64 centimeters ($\frac{1}{4}$ inch) or less in thickness made of individual wood particles which have been coated with a binder and formed into flat sheets by pressure.

(45) "Three-piece can side-seam spray" means a coating sprayed on the exterior and interior of a welded, cemented or soldered seam to protect the exposed metal.

(46) "Tileboard" means paneling that has a colored waterproof surface coating.

(47) "Topcoat" means a coating applied over a prime coat for purposes of appearance, identification or protection of the substrate.

(48) "Transfer efficiency" means the portion of coating solids which adheres to the surface being coated during the application process, expressed as a percentage of the total volume of coating solids delivered to the applicator.

(49) "Two-piece can exterior end coating" means a coating applied by roller coating or spraying to the exterior end of a can to provide protection to the metal.

(50) "Vinyl coating" means printing on or applying a decorative or protective topcoat, other than vinyl plastisols or organosols, to vinyl or urethane coated fabric or vinyl or urethane sheets.

History: Renum. from NR 154.01, Register, September, 1986, No. 369, eff. 10-1-86; cr. (24m), Register, January, 1987, No. 373, eff. 2-1-87; cr. (21m), Register, July, 1988, No. 391, eff. 8-1-88; cr. (12m), (16m) and (33m), am. (34) and (47), Register, August, 1989, No. 404, eff. 9-1-89; renum. (6) to be NR 400.02 (21m), am. (16), (32) (33m) and (50), cr. (23m), (33g) and (41m), (12s) renum. from NR 400.02 (36), Register, February, 1990, No. 410, eff. 3-1-90;

Register, December, 1993, No. 456

am. (7), Register, May, 1992, No. 437, eff. 6-1-92; am. (50), Register, December, 1993, No. 456, eff. 1-1-94.

NR 422.03 Exemptions. Sections NR 422.04 to 422.155 apply to any facility which contains one or more of the surface coating or printing process lines described in ss. NR 422.05 to 422.155, except as specified in this section. If VOC emissions exceed an exemption level given in this section, the exemption will no longer apply to the source. Exempt facilities include:

(1) Any surface coating process line which meets the specific applicability requirements of ss. NR 422.04 to 422.155 within a facility when actual emissions of VOCs from all surface coating process lines meeting the same applicability requirements within the facility are never greater than 6.8 kilograms (15 pounds) in any one day with all emission control equipment inoperative.

(2) Surface coating facilities as described under s. NR 422.15 or 422.155 which have maximum theoretical emissions of VOCs from all surface coating process lines meeting the applicability requirements of s. NR 422.15 or 422.155 within the facility of less than or equal to 10 tons per year.

(3) Surface coating facilities as described under ss. NR 422.05 to 422.08, 422.09 to 422.13, 422.15 and 422.155 which are located outside the counties of Brown, Calumet, Dane, Dodge, Door, Fond du Lac, Jefferson, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha, and Winnebago and which have total emissions of VOCs from the facility, with all emission control equipment inoperative, of less than or equal to 100 tons per year.

(4) Printing facilities as described under s. NR 422.14 which are located in the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington or Waukesha and have maximum theoretical emissions of VOCs from the facility of less than or equal to 25 tons per year, or are located outside the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington and Waukesha and have maximum theoretical emissions of VOCs from the facility of less than or equal to 100 tons per year.

(5) Surface coating process sources used exclusively for chemical or physical analysis or determination of product quality and commercial acceptance where:

(a) The operation of the source is not an integral part of the production process; and

(b) The emissions from the source do not exceed 363 kilograms (800 pounds) in any calendar month; and

(c) The exemption is approved in writing by the department.

(6) Leather surface coating facilities as described under s. NR 422.085 which are:

(a) Located outside the counties of Door, Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington and Waukesha; or

(b) Located in the counties of Kenosha, Milwaukee, Ozaukee, Racine, Washington, or Waukesha, and which have maximum theoretical emissions of VOCs from the facility of less than 25 tons per year; or

(c) Located in the counties of Door, Kewaunee, Manitowoc, Sheboygan or Walworth, and which have maximum theoretical emissions of VOCs from the facility of less than 100 tons per year.

History: Renum. from NR 154.13 (4) (a) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (3) and cr. (6), Register, January, 1987, No. 373, eff. 2-1-87; am. (intro.), (2) and (3), Register, August, 1989, No. 404, eff. 9-1-89; am. (intro.), (1) to (4) and (6) (b), Register, February, 1990, No. 410, eff. 3-1-90; am. (intro.) and (2), Register, May, 1992, No. 437, eff. 6-1-92; am. (1) to (4), (6) (a) and (b), Register, December, 1993, No. 456, eff. 1-1-94.

NR 422.04 Methods of compliance. (1) IN-LINE AVERAGING. Compliance with the emission limitations of this chapter may be achieved through a daily volume-weighted average of all coatings or inks applied by emission units in a process line subject to the same numerical emission limitation. Any owner or operator achieving compliance by means of this subsection shall comply with the reporting requirements of s. NR 439.03 (7) and the recordkeeping requirements of s. NR 439.04 (5) (g).

(a) No owner or operator of a coating line subject to an emission limitation contained in ss. NR 422.05 to 422.08, 422.09 to 422.12, 422.15 or 422.155 and complying with the emission limitation by means of this subsection may cause, allow or permit the daily volume-weighted average VOC content to exceed the emission limitation to which the coatings are subject. For purposes of this paragraph, daily volume-weighted average VOC content shall be calculated by using the following equation:

$$VOC_A = \left[\sum_{i=1}^n C_i V_i \right] / V_T$$

where:

VOC_A is the volume-weighted average VOC content of two or more coatings applied on a coating line during any day in kilograms per liter (pounds per gallon) of coating, excluding water

i is the subscript denoting an individual coating

n is the number of different coatings subject to the same numerical emission limitation applied during any day on a coating line

C_i is the VOC content of each coating (i) as applied during any day on the coating line in kilograms per liter (pounds per gallon) of coating, excluding water

V_i is the volume of each coating (i), excluding water, as applied during any day on the coating line in liters (gallons)

V_T is the total volume of all n coatings subject to the same emission limitation, excluding water, applied during any day on the coating line in liters (gallons)

(b) No owner or operator of a printing line subject to an emission limitation contained in s. NR 422.14 (2) (a) or (b) and complying with the emission limitation by means of this subsection may cause, allow or permit the daily volume-weighted average VOC content to exceed the emission limitation to which the inks are subject.

1. When s. NR 422.14 (2) (a) applies, the daily volume-weighted average VOC content shall be calculated by using the following equation:

$$\text{VOC}_B = \frac{\sum_{i=1}^n C_i L_i V_{VFi}}{\sum_{i=1}^n L_i V_{VFi}}$$

where:

VOC_B is the volume-weighted average VOC content of 2 or more inks applied on a printing line during any day in percent VOC by volume of the volatile fraction

i is the subscript denoting an individual ink

n is the number of different inks subject to the same emission limitation applied during any day on a printing line

C_i is the VOC content in percent VOC by volume of the volatile fraction in each ink (i) as applied

L_i is the volume of each ink (i) as applied in liters (gallons)

V_{VFi} is the volume fraction volatile content in each ink (i) as applied

2. When s. NR 422.14 (2) (b) applies, the daily volume-weighted average VOC content shall be calculated by using the following equation:

$$\text{VOC}_C = \left[\sum_{i=1}^n C_i V_i \right] / V_T$$

where:

VOC_C is the volume-weighted average VOC content of 2 or more inks applied on a printing line during any day in percent VOC by volume, excluding water

i is the subscript denoting an individual ink

n is the number of different inks subject to the same emission limitation applied during any day on a printing line

C_i is the VOC content of each ink (i) applied during any day on the printing line in percent VOC by volume, excluding water

V_i is the volume of each ink (i), excluding water, applied during any day on the printing line in liters (gallons)

V_T is the total volume of all n inks subject to the same emission limitation, excluding water, applied during any day on the printing line in liters (gallons)

(c) An owner or operator of a coating or printing line subject to an emission limitation in this chapter not specified in par. (a) or (b) may comply by means of this subsection only by obtaining prior department approval through an order issued under s. 144.31 (2) (b), Stats., or through a permit. Any approval granted by the department under this paragraph shall be submitted to, and will not become effective for federal purposes until approved by, the administrator of the U.S. environmental protection agency or designee as a source-specific revision to the department's state implementation plan for ozone.

(2) GENERAL METHODS. The surface coating emission limitations shall be achieved by:

- (a) The application of low solvent content coating technology; or
- (b) A vapor recovery system which recovers the solvent for reuse; or
- (c) Incineration or catalytic oxidation, provided that 90% of the nonmethane VOCs (VOC measured as total combustible carbon) which enter the incinerator or oxidation unit are oxidized to non-organic compounds; or

(d) An equivalent system or approach demonstrated to reliably control emissions to a level at or below the applicable emission limit and approved by the department. Any approval granted by the department under this paragraph shall be submitted to, and will not become effective for federal purposes until approved by, the administrator of the U.S. environmental protection agency or designee as a source-specific revision to the department's state implementation plan for ozone.

(3) HIGH TRANSFER EFFICIENCY COATING APPLICATION. (a) Surface coating operations covered under ss. NR 422.09 to 422.11 and 422.15 have the added option of achieving compliance with the emission limitation through the use of an alternative control method or system involving a high transfer efficiency coating application system, either when used alone or in conjunction with low solvent content coating technology.

(b) Compliance under the option provided in this subsection must be approved by the department. This requires that:

1. The design, operation, and efficiency of the application system must be certified in writing by the owner or operator and submitted to the department for approval, and

2. The solvent usage per coated part for application system must be less than or equal to the solvent usage per coated part at the applicable emission limitation using baseline transfer efficiency.

(c) Each alternative control method or system approval granted by the department under this subsection shall be submitted to, and will not become effective for federal purposes until approved by, the administrator of the U.S. environmental protection agency or designee as a source-specific revision to the department's state implementation plan for ozone.

(4) CAPTURE SYSTEMS. The design, operation and efficiency of any capture system used in conjunction with sub. (2) (b), (c) or (d) shall be certified in writing by the owner or operator. The efficiency of the capture system is subject to approval by the department and shall be great enough to insure that the emissions for any day from the controlled line are less than or equal to the amount determined using the following equation:

$$E = \left[\sum_{i=1}^n A_i B_i C_i \right] / D_i$$

where:

E is the total allowable daily emissions of VOCs in kilograms (pounds) from all coatings or inks subject to the same numerical emission limitation and applied on the controlled line

i is the subscript denoting an individual coating or ink

n is the number of different coatings or inks applied

A_i is the allowable emission rate for the coatings or inks pursuant to ss. NR 422.05 to 422.155 in kilograms per liter (pounds per gallon) of coating or ink, excluding water, delivered to the applicator

B_i is the amount of coating material or ink in liters (gallons), delivered to the applicator during the actual production day

C_i is the volume fraction of solids in the coating or ink, delivered to the applicator during the actual production day

D_i is the theoretical volume fraction of solids in the coating or ink necessary to meet the allowable emission rate pursuant to ss. NR 422.05 to 422.15 calculated from:

$$D_i = 1 - [A_i / P_i]$$

where:

P_i is the density of the VOC used in the coating or ink delivered to the applicator during the actual production day in kilograms per liter (pounds per gallon). If the coating or ink does not contain any VOCs, or if the actual VOC density cannot be demonstrated by the owner or operator, a value of 0.88 kilograms per liter (7.36 pounds per gallon) shall be used for P_i .

History: Renum. from NR 154.13 (4) (b) and am. Register, September, 1986, No. 369, eff. 10-1-86; renum. (1) to (3) to be (2) to (4) and am. (3) (a), (b) (intro.) and 1, and (4), cr. (1) and (3) (c), Register, February, 1990, No. 410, eff. 3-1-90; renum. (1) to be (1) (intro.) and am., cr. (1) (a) to (c), am. (2) (d) and (3) (c), r. and recr. (4), Register, December, 1993, No. 456, eff. 1-1-94.

NR 422.05 Can coating. (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to coating applicators and ovens of sheet, can or end coating lines involved in sheet basecoat (exterior and interior) and overvarnish; 2-piece can exterior (basecoat and overvarnish); 2- and 3-piece can interior body spray; 2-piece can exterior end (spray or roll coat); 3-piece can side-seam spray and end sealing compound operations. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a can coating line may cause, allow or permit the emission of any VOCs in excess of:

(a) 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, delivered to each coating applicator from sheet basecoat (exterior and interior) and overvarnish or 2-piece can exterior (basecoat and overvarnish) operations,

(b) 0.51 kilograms per liter of coating (4.2 pounds per gallon), excluding water, delivered to each coating applicator from 2- and 3-piece can

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interior body spray and 2-piece can exterior end (spray or roll coat) operations,

(c) 0.66 kilograms per liter of coating (5.5 pounds per gallon), excluding water, delivered to each coating applicator from 3-piece can side-seam spray operations, or

(d) 0.44 kilograms per liter of coating (3.7 pounds per gallon), excluding water, delivered to each coating applicator from end sealing compound operations.

(3) COMPLIANCE EXTENSIONS. (a) Notwithstanding the emission limitations of sub. (2) and the provisions of s. NR 425.03, the department may extend until December 31, 1985 the deadline for compliance with the emission limitations of sub. (2), provided that:

1. The can coating operation is a sheet basecoat, exterior or interior, or overvarnish operation and, by itself or by the internal offset provisions of s. NR 425.05, meets an interim VOC emission limitation after December 31, 1982 of 0.48 kilograms per liter of coating (4.0 pounds per gallon), excluding water, delivered to each coating applicator, or

2. The can coating operation is an end sealing compound operation and, by itself or by the internal offset provisions of s. NR 425.05, meets an interim VOC emission limitation after December 31, 1982 of 0.52 kilograms per liter of coating (4.3 pounds per gallon), excluding water, delivered to each coating applicator, and

3. The owner or operator of the can coating facility submits a written request for a compliance extension under this subsection and shows, to the department's satisfaction, that a compliance extension is necessary in order to comply with the emission limitations of sub. (2) through the use of low solvent content coating application technology.

(b) If, during the term of an extension granted under this subsection, the department determines that the can coating operation is not meeting its interim emission limitation, that advances in low solvent content coating application technology eliminate the need for the extension, or that the emission limitations of sub. (2) can be met without the use of energy intensive control devices, it may terminate the extension. Upon termination, the emission limitations of sub. (2) shall apply.

History: Renum. from NR 154.13 (4) (c) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (3) (a) 1. and 2., Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.06 Coil coating. (1) APPLICABILITY. This section applies, subject to the provisions of s. NR 425.03, to the coating applicators, ovens and quench areas of coil coating lines involved in prime and topcoat or single coat operations. This section does not apply to sources exempted under s. NR 422.03.

(2) EMISSION LIMITATIONS. No owner or operator of a coil coating line may cause, allow or permit the emission of any VOCs in excess of 0.31 kilograms per liter of coating (2.6 pounds per gallon), excluding water, delivered to each coating applicator from prime and topcoat or single coat operations.

History: Renum. from NR 154.13 (4) (d) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2), Register, February, 1990, No. 410, eff. 3-1-90.

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NR 422.07 Paper coating. (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the coating applicators, including but not limited to blade, air knife or roll coaters, and drying ovens of paper coating lines. This section does not apply to any piece of equipment on which a nonuniform coating is applied to a substrate, as in printing, or to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a paper coating line may cause, allow or permit the emission of any VOCs in excess of 0.35 kilograms per liter of coating (2.9 pounds per gallon), excluding water, delivered to each coating applicator from a paper coating line.

History: Renum. from NR 154.13 (4) (e) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.08 Fabric and vinyl coating. (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the coating applicators, including but not limited to blade, roll, rotogravure or dip coaters, and drying ovens of fabric and vinyl coating lines. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a fabric coating line or a vinyl coating line may cause, allow or permit the emission of any VOCs in excess of:

(a) 0.35 kilograms per liter of coating (2.9 pounds per gallon), excluding water, delivered to each coating applicator from a fabric coating line.

(b) 0.45 kilograms per liter of coating (3.8 pounds per gallon), excluding water, delivered to each coating applicator from a vinyl coating line.

History: Renum. from NR 154.13 (4) (f) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.085 Leather coating. (1) **APPLICABILITY.** Effective February 1, 1987, this section applies to coating applications at leather coating facilities. This section does not apply to sources exempted under s. NR 422.03 (6).

(2) **EMISSION LIMITATIONS.** No owner or operator of a leather coating facility may cause, allow, or permit the emission of any VOCs from coating applications in excess of 18.6 kilograms per 100 square meters (38.0 pounds per 1000 square feet) of coated product calculated on a daily average basis.

(3) **COMPLIANCE REQUIREMENTS AND SCHEDULES.** The owner or operator of a leather coating facility shall comply with the requirements of sub. (4) and s. NR 425.03 (1), (8) and (9).

(4) **REPORTING AND RECORDKEEPING.** (a) To determine compliance with the leather coating VOC emission limit in this section, the facility shall maintain daily coating usage and leather production records in a format approved by the department. Reporting, recordkeeping and access to these records shall be in accordance with ss. NR 439.03 to 439.05.

(b) The daily VOC emission rate shall be determined by the following equation:

$$c = a/b$$

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where:

c is the daily average VOC emission rate,

a is the total amount of VOCs emitted during the day, and

b is the prorated surface area of leather coated during the day, where:

$$b = \sum_{i=1}^n d_i e_i,$$

d_i is the total area of the i th batch of hides coated during the day, and

e_i is the ratio of actual VOC emissions resulting from coating any portion of the i th batch of hides during the day to the total predicted VOC emissions resulting from all coating of the entire i th batch.

(c) The facility shall measure the surface area of each piece of leather coated with a mechanism initially calibrated for minimum accuracy to the Turner Korreck Machine or Sawyer Measurement systems. The average surface area per coated piece of leather may be used for a batch of leather provided that the average is based on a minimum of 500 pieces. Otherwise, the facility average surface area per coated leather piece shall be used. In no case may the total area allocated to production over all days from a piece of leather exceed the average area for that leather.

History: Cr. Register, January, 1987, No. 373, eff. 2-1-87; am. (2) and (3), cr. (4), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.09 Automobile and light-duty truck manufacturing. (1) APPLICABILITY. This section applies, subject to the provisions of s. NR 425.03 (6), to the application areas, flashoff areas, and ovens of automobile and light-duty truck manufacturing plants involved in prime, topcoat and final repair coating of metallic front end and main body parts. This section does not apply to the coating of wheels, trunk interiors, steering columns or nonmetallic parts; to sealers or nonpriming anti-rust coatings; or to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS — ENAMELS.** No owner or operator of an automobile surface coating line which, prior to January 1, 1979, used an enamel coating system, may cause, allow or permit the emission of any VOCs in excess of:

(a) After December 31, 1983, 0.14 kilograms per liter of coating (1.2 pounds per gallon), excluding water, from an electrodeposition prime coat or equivalent coating line.

(b) After December 31, 1982, 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, from a spray primer-surfacer coating line.

(c) After December 31, 1982, and until December 31, 1985, 0.45 kilograms per liter of coating (3.7 pounds per gallon), excluding water, from a topcoat coating line.

(d) After December 31, 1985, 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, from a topcoat coating line.

(e) After December 31, 1982, 0.58 kilograms per liter of coating (4.8 pounds per gallon), excluding water, from any final repair coating line.

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(3) EMISSION LIMITATIONS — LACQUERS. No owner or operator of an automobile surface coating line which, prior to January 1, 1979, used a lacquer coating system, may cause, allow or permit the emission of any VOCs in excess of:

(a) After August 1, 1979, and until December 31, 1982, 0.27 kilograms per liter of coating (2.2 pounds per gallon), excluding water, from an electrodeposition prime coat coating line.

(b) After December 31, 1982, 0.14 kilograms per liter of coating (1.2 pounds per gallon), excluding water, from an electrodeposition prime coat coating line.

(c) After December 31, 1980, and until December 31, 1986, 0.36 kilograms per liter of coating (3.0 pounds per gallon), excluding water, from a spray primer-surfacer coating line.

(d) After December 31, 1986, 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, from a spray primer-surfacer coating line.

(e) After December 31, 1979, and until December 31, 1981, 0.70 kilograms per liter of coating (5.8 pounds per gallon), excluding water, from a topcoat coating line.

(f) After December 31, 1981, and until December 31, 1986, 0.61 kilograms per liter of coating (5.0 pounds per gallon), excluding water, from a topcoat coating line.

(g) After December 31, 1986, 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, from a topcoat coating line.

(h) After August 1, 1979, and until December 31, 1986, 0.79 kilograms per liter of coating (6.5 pounds per gallon), excluding water, from any final repair coating line.

(i) After December 31, 1986, 0.58 kilograms per liter of coating (4.8 pounds per gallon), excluding water, from any final repair coating line.

(4) EMISSION LIMITATIONS — TRUCKS. No owner or operator of a light-duty truck surface coating line may cause, allow or permit the emission of any VOCs in excess of:

(a) After January 1, 1981, and until December 31, 1982, 0.27 kilograms per liter of coating (2.2 pounds per gallon), excluding water, from an electrodeposition prime coat coating line.

(b) After December 31, 1982, 0.14 kilograms per liter of coating (1.2 pounds per gallon), excluding water, from an electrodeposition prime coat coating line.

(c) After December 31, 1980, and until December 30, 1987, 0.41 kilograms per liter of coating (3.4 pounds per gallon), excluding water, from a spray primer-surfacer coating line.

(d) After December 31, 1987, 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, from a spray primer-surfacer coating line.

(e) After December 31, 1982, and until December 30, 1987, 0.44 kilograms per liter of coating (3.6 pounds per gallon), excluding water, from a topcoat coating line.

(f) After December 31, 1987, 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, from a topcoat coating line.

(g) After December 31, 1982, 0.58 kilograms per liter of coating (4.8 pounds per gallon), excluding water, from any final repair coating line.

(5) **EMISSION RATE AVERAGING.** Each emission limit in this section may be interpreted as a weighted daily average, if specified in an approved compliance plan. The emission limits are referenced to water-borne coatings conventionally applied. Any coating line which achieves an equivalent emission rate per unit area coated shall be deemed in compliance.

History: Renum. from NR 154.13 (4) (g) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), (3) (intro.), (4) (intro.) and (5), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.10 Furniture metal coating. (1) APPLICABILITY. This section applies, subject to the provisions of s. NR 425.03, to the application areas, flashoff areas, and ovens of furniture metal coating lines involved in prime and topcoat or single coating operations. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a furniture metal coating line may cause, allow, or permit the emission of any VOCs in excess of 0.36 kilograms per liter of coating (3.0 pounds per gallon), excluding water, delivered to each coating applicator from prime and topcoat or single coat operations.

History: Renum. from NR 154.13 (4) (h) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.11 Surface coating of large appliances. (1) APPLICABILITY. This section applies, subject to the provisions of s. NR 425.03, to application areas, flashoff areas, and ovens of large appliance coating lines involved in single, prime, or topcoat coating operations. This section does not apply to:

(a) Sources exempted under s. NR 422.03; or

(b) The use of quick-drying lacquers for repair of scratches and nicks that occur during assembly, provided that the volume of coating does not exceed 0.95 liters (1 quart) in any one 8-hour period for any appliance coating line.

(2) **EMISSION LIMITATIONS.** No owner or operator of a large appliance coating line may cause, allow or permit the emission of any VOCs in excess of 0.34 kilograms per liter of coating (2.8 pounds per gallon), excluding water, delivered to each coating applicator from single, prime, or topcoat coating operations.

History: Renum. from NR 154.13 (4) (i) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.12 Magnet wire coating. (1) APPLICABILITY. This section applies, subject to the provisions of s. NR 425.03, to the ovens of magnet wire coating operations. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATION.** No owner or operator of a magnet wire coating oven may cause, allow or permit the emission of any VOCs in excess of 0.20 kilograms per liter of coating (1.7 pounds per gallon), excluding water, delivered to each coating applicator from magnet wire coating operations.

History: Renum. from NR 154.13 (4) (j) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.13 Flat wood panel coating. (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the coating lines of flat wood panel facilities involved in the surface coating of printed interior panels made of hardwood plywood and thin particleboard, natural finish hardwood plywood panels, or hardboard paneling with class II finishes. This section does not apply to the manufacture of exterior siding, tileboard, or particleboard used as a furniture component; or to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a flat wood panel coating line may cause, allow, or permit the emission of any VOCs from a coating application system in excess of:

(a) 2.9 kilograms per 100 square meters of coated finished product (6.0 pounds per 1,000 square feet) from printed interior panels, regardless of the number of coats applied;

(b) 5.8 kilograms per 100 square meters of coated finished product (12.0 pounds per 1,000 square feet) from natural finish hardwood plywood panels, regardless of the number of coats applied; and

(c) 4.8 kilograms per 100 square meters of coated finished product (10.0 pounds per 1,000 square feet) from class II finishes on hardboard panels, regardless of the number of coats applied.

History: Renum. from NR 154.13 (4) (k), Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.14 Graphic arts. (1) **APPLICABILITY.** This section applies, subject to the provisions of s. NR 425.03, to the printing lines of all packaging rotogravure, publication rotogravure, and flexographic printing facilities. This section does not apply to sources exempted under s. NR 422.03.

(2) **EMISSION LIMITATIONS.** No owner or operator of a packaging rotogravure, publication rotogravure, or flexographic printing line may operate, or cause, allow or permit the operation of the line unless:

(a) The volatile fraction of ink, as it is applied to the substrate, contains 25% by volume or less of VOC and 75% by volume or more of water;

(b) The ink, as it is applied to the substrate, less water, contains 60% by volume or more nonvolatile material; or

(c) The owner or operator installs and operates:

1. A vapor recovery system which reduces the VOC emissions from the capture system by at least 90% by weight;

2. An incineration or catalytic oxidation system, provided that 90% by weight of the VOCs, VOC measured as total combustible carbon, Register, December, 1993, No. 456

which enter the incinerator or oxidation unit are oxidized to nonorganic compounds; or

3. An alternative VOC emission reduction system demonstrated to have at least a 90% reduction efficiency, as measured across the control system, and approved by the department. Any approval granted by the department under this subdivision shall be submitted to, and will not become effective for federal purposes until approved by, the administrator of the U.S. environmental protection agency or designee as a source-specific revision to the department's state implementation plan for ozone.

(3) CONTROL SYSTEM. The overall emission reduction efficiency of any capture system and control device used in conjunction with sub. (2) (c) shall be at least:

- (a) 75% where a publication rotogravure process is employed;
- (b) 65% where a packaging rotogravure process is employed; or
- (c) 60% where a flexographic printing process is employed.

History: Renum. from NR 154.13 (2) (l) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (intro.), Register, February, 1990, No. 410, eff. 3-1-90; am. (2) (a), (c) 2. and 3., (3) (intro.), (b) and (c), Register, December, 1993, No. 456, eff. 1-1-94.

NR 422.15 Miscellaneous metal parts and products. (1) APPLICABILITY. This section applies, subject to the provisions of s. NR 425.03, to all coating line application areas, conveyors, flashoff areas, drying areas, forced air driers, and ovens of any industry categorized under the 2-digit major groups of 33 to 39 as described in the Standard Industrial Classification Manual, 1987, incorporated by reference in ch. NR 484, which are involved in the surface coating of miscellaneous metal parts and products with the following exceptions:

- (a) Coating of airplane exteriors;
- (b) Coating of marine vessels;
- (c) Automobile refinishing;
- (d) Customized topcoating of automobiles and trucks if production is less than 35 vehicles per day;
- (e) Adhesives and materials used to prepare a surface for adhesives at facilities located outside the counties of Door, Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington and Waukesha;
- (g) Sealants or fillers whose purpose is to seal or fill seams, joints, holes and minor imperfections of surfaces, and which are applied at facilities located outside the counties of Door, Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington and Waukesha;
- (h) Coating lines covered under ss. NR 422.05 to 422.12;
- (i) Sources exempted under s. NR 422.03;
- (j) Silk screening of metal parts and products at facilities located outside the counties of Door, Kenosha, Kewaunee, Manitowoc, Milwau-

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kee, Ozaukee, Racine, Sheboygan, Walworth, Washington and Waukesha; or

(k) Coat operations subject to s. NR 422.155.

(2) EMISSION LIMITATIONS --- CURED COATINGS. No owner or operator of a miscellaneous metal parts or products coating line using a baked or specially cured coating technology may cause, allow, or permit the emission of any VOCs in excess of:

(a) 0.52 kilograms per liter (4.3 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies clear coatings;

(b) 0.42 kilograms per liter (3.5 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies extreme performance coatings; and

(c) 0.36 kilograms per liter (3.0 pounds per gallon) of coating, excluding water, delivered to a coating applicator for all other coatings.

(3) EMISSION LIMITATIONS --- AIR DRIED COATINGS. No owner or operator of a miscellaneous metal parts or products coating line using an air dried coating technology may cause, allow, or permit the emission of any VOCs in excess of:

(a) After December 31, 1982, 0.58 kilograms per liter (4.8 pounds per gallon) of any coating, excluding water, delivered to a coating applicator;

(b) After December 31, 1985, 0.52 kilograms per liter (4.3 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies clear coatings;

(c) After December 31, 1985, 0.42 kilograms per liter (3.5 pounds per gallon) of coating, excluding water, delivered to a coating applicator for all other coatings.

(4) EMISSION LIMITATIONS --- PRETREATMENT COATS. This subsection applies to miscellaneous metal parts and products coating lines which are located outside the counties of Door, Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Sheboygan, Walworth, Washington and Waukesha. No owner or operator of a miscellaneous metal parts or products coating line may cause, allow, or permit the emission of any VOCs in excess of 0.78 kilograms per liter (6.50 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies pretreatment coats. Coatings subject to this subsection may not participate in an internal offset under s. NR 425.05 or generate emission reduction credits in an emission reduction option.

(5) EMISSION LIMITATIONS AND REQUIREMENTS --- HIGH PERFORMANCE ARCHITECTURAL COATINGS. This subsection applies to miscellaneous metal parts and products coating lines which were involved in the application of high performance architectural coatings, prior to July 1, 1983, and are located outside the counties of Brown, Calumet, Dane, Dodge, Door, Fond du Lac, Jefferson, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha and Winnebago.

(a) No owner or operator of a miscellaneous metal parts or products coating line which applies a high performance architectural coating may

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cause, allow or permit the emission of any VOCs from the coating in excess of:

1. 0.65 kilograms per liter (5.4 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies prime coatings;

2. 0.70 kilograms per liter (5.8 pounds per gallon) of coating, excluding water, delivered to a coating applicator for all other coatings.

(b) The owner or operator of a miscellaneous metal parts and products coating line may demonstrate compliance with the emission limits of this subsection by demonstrating, on a daily basis, that the combined emission rate from all high performance architectural coatings is less than or equal to the allowable emission rate as determined by the equation in s. NR 425.05 (2) (b) 2.

(6) CHANGE IN TECHNOLOGY. Miscellaneous metal parts or products coating lines which, prior to January 1, 1980, used a baked or specially cured coating technology shall meet the emission limitations of sub. (2) notwithstanding the coating technology presently in use.

(7) MULTIPLE LIMITATIONS. If more than one emission limitation in sub. (2) applies to a specific coating, then the least stringent emission limitation shall be applied.

(8) SOLVENT WASHINGS. All VOC emissions from solvent washings shall be considered in the emission limitations in subs. (2) and (3), unless the used wash solvent is directed into containers that prevent evaporation into the atmosphere.

History: Renum. from NR 154.13 (4) (m) and am. Register, September, 1986, No. 369, eff. 10-1-86; renum. (4) to (6) to be (5) to (7), cr. (4), Register, July, 1988, No. 391, eff. 8-1-88; am. (1) (h) and (i), cr. (1) (j), Register, April, 1989, No. 400 eff. 5-1-89; am. (1) (i) and (j), cr. (1) (k), Register, August, 1989, No. 404, eff. 9-1-89; am. (1) (b), (2) (intro.) and (3) (intro.), r. (1) (f), renum. (4) to (7) to be (5) to (8) and am. (5) (b), cr. (4), Register, February, 1990, No. 410, eff. 3-1-90; am. (1) (intro.), (e), (g) and (j), (4), (5) (intro.) and (b), Register, December, 1993, No. 456, eff. 1-1-94.

NR 422.155 Fire truck and emergency response vehicle manufacturing.

(1) APPLICABILITY. This section applies to coating operations of fire truck and emergency response vehicle manufacturing where meeting applicable emission limits in s. NR 422.15 is not technologically or economically feasible and where total facility production of fire trucks and emergency response vehicles is less than 35 vehicles per day.

(2) EMISSION LIMITATIONS. No owner or operator of a fire truck or emergency response vehicle coating operation may cause, allow or permit the emission of any VOCs in excess of:

(a) 0.80 kilograms per liter (6.68 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies pretreatment coats.

(b) 0.53 kilograms per liter (4.44 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies prime coats.

(c) 0.72 kilograms per liter (6.00 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies topcoats.

(d) 0.42 kilograms per liter (3.50 pounds per gallon) of coating, excluding water, delivered to a coating applicator that applies clear coats.

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(3) **SOLVENT WASHINGS.** All VOC emissions from solvent washings shall be considered in the emission limitations in sub. (2), unless the used wash solvent is directed into containers that prevent evaporation into the atmosphere.

(4) **INTERNAL OFFSETS.** Coating operations subject to this section may not be involved in an internal offset under s. NR 425.05.

History: Cr. Register, August, 1989, No. 404, eff. 9-1-89; am. (2) (a) to (d) and (4), Register, February, 1990, No. 410, eff. 3-1-90.

NR 422.16 Use of asphalt surfacing materials. (1) **APPLICABILITY.** This section applies to the mixing, storage, use and application of cutback asphalts in Wisconsin. This section does not apply to cutback asphalts intended for uses other than application to surfaces traversed by motor vehicles, bicycles or pedestrians.

(2) **RESTRICTED MATERIALS.** The following restrictions apply to the mixing, open storage, use or application of cutback asphalts during the ozone season:

(a) The use of rapid curing cutback asphalts containing gasoline or naphtha as the diluent is prohibited.

(b) The use of cutback asphalts not prohibited under par. (a) is prohibited except for:

1. Application of a single coat of liquid asphalt to an aggregate base to control dust; and

2. Use as a penetrating prime coat during the first and last months of the ozone season.

History: Renum. from NR 154.13 (5) (a) and am. Register, September, 1986, No. 369, eff. 10-1-86; am. (2) (a) and (b), r. (2) (c), Register, February, 1990, No. 410, eff. 3-1-90.